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Age, Psychological Maturity, and the Transition to Motherhood

Among English-speaking Australian Women in a Metropolitan Area

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Abstract

In the context of the trend toward delayed parenthood, this study examines whether older maternal age is associated with greater psychological maturity, and whether greater psychological maturity provides any adaptive benefit during the transition to motherhood. A sample of 240 predominantly English-speaking Australian women in a metropolitan area expecting their first baby (mean age = 32.81 years; 41% conceived after fertility treatment) completed measures of psychological maturity (hardiness, ego development, and ego resiliency) and pregnancy adaptation (maternal fetal attachment and formation of a maternal identity) in the third trimester of pregnancy, and a measure of postnatal adjustment at 4-6 months postpartum. Structural equation modelling showed age was positively associated with a latent construct of psychological maturity, and psychological maturity was associated with more optimal adaptation in pregnancy and early motherhood. Both psychological maturity and pregnancy adaptation predicted positive postnatal adjustment. Age was indirectly related to adaptation through its relationship with psychological maturity. The relationships in the model applied regardless of mode of conception (fertility treatment or spontaneous). Potentially confounding contextual factors associated with older motherhood, higher education and maternal and child health, were included in the model. These results suggest that psychological maturity is a benefit of motherhood at older ages.

Keywords: maternal age, psychological maturity, pregnancy adaptation, transition to motherhood

Age, Psychological Maturity, and the Transition to Motherhood Among English-speaking
Australian Women in a Metropolitan Area

More women are becoming mothers over the age of 35 (ABS, 2011; Office of National Statistics, 2012; U.S. Census Bureau, 2012). Older women are more likely to require assisted reproductive technologies (ART) to conceive (Collins & Crosignani, 2005) and also face increased risks of pregnancy and birth complications (Carolan & Frankowska, 2011). However, older first-time mothers are more likely to be better educated, financially secure, and bring with them psychological resources which may positively contribute to their parenting ability (Bornstein, Putnick, Suwalsky, & Gini, 2006; Sutcliffe, Barnes, Belsky, Gardiner, & Melhuish, 2012). Few studies of the effects of older maternal age on adjustment to parenthood have considered that these contextual factors might confound results. Additionally, research focusing on the psychological correlates of older maternal age and the processes linking age and child or maternal outcomes is lacking (Bornstein, et al., 2006; Fergusson & Woodward, 1999).

Adaptation during the Transition to Motherhood

In the transition to parenthood, a woman integrates the role of mother into her sense of self and forms a relationship with her infant, with these developmental tasks beginning in pregnancy (Cranley, 1981; Leifer, 1980; Mercer, 2004). The early months following birth are particularly challenging (Mercer, 1986), but by four to five months postpartum many women reach a turning point characterized by greater competence, a sense of achievement, more rewarding interactions, and acceptance of normal feelings of ambivalence about the baby and associated life changes (Carolan, 2005; Mercer, 1986).

Research confirms that pregnancy adaptation predicts competence and fulfilment as a mother (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988; Kiehl & White, 2003), which, in turn, is associated with the development of a healthy mother-infant relationship

(Cohen & Slade, 2000; Siddiqui & Hägglöf, 2000). Effects can be lasting with early maternal adjustment found to be associated with children's emotional and behavioural functioning at age six (Anhalt, Telzrow, & Brown, 2007).

Age and Adaptation during the Transition to Motherhood

Results of studies comparing adaptation between older and younger mothers are difficult to reconcile due to differences in the definition of 'older' and failure to account for possible confounds. For example, the threshold for older age seems to vary with the year of publication, from age 30 (Gottesman, 1992; Mercer, 1986) to age 35 (Berryman & Windridge, 1996; Carolan, 2005) and more recently age 38 (Boivin et al., 2009; McMahon, Gibson, Allen, & Saunders, 2007) and 40 (Sutcliffe, et al., 2012). Nevertheless, the few prospective studies report generally positive adjustment for older women in pregnancy (Berryman & Windridge, 1996; Gottesman, 1992; Windridge & Berryman, 1996), although a recent review found the relationship between maternal age and prenatal attachment remains unclear (Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009).

Studies examining maternal age and postnatal adjustment also report inconsistent findings. Older maternal age has been associated with better adaptation (Grossman, Eichler, & Winickoff, 1980; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982), less gratification with mothering (Mercer, 1986), and comparable adjustment to younger mothers (Windridge & Berryman, 1996). Carolan (2005) reported that older mothers may take longer to adapt to motherhood, while Bornstein et al. (2006) found an association between older maternal age and a tendency to perceive infants as more difficult or have more difficulty coping with the normative challenges of newborn behavior.

Contextual Factors Associated with Older Maternal Age

Many women conceiving later in their reproductive life-cycle require medical assistance (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012). Few studies of age and

maternal adaptation consider that conception using ART might confound results, whereas studies of mothers conceiving using ART generally control for maternal age thereby obscuring its effects. A recent review of studies comparing adaptation to early parenthood in women conceiving using ART and those conceiving spontaneously (Hammarberg, Fisher, & Wynter, 2008) concluded that findings are equivocal. While many studies report comparable adjustment irrespective of mode of conception, one group of researchers report higher rates of early parenting difficulties among ART mothers (Fisher, Rowe, & Hammarberg, 2012), and more intense fetal attachment during pregnancy (Fisher, Hammarberg, & Baker, 2008). They speculate that the struggle to conceive may lead these women to idealize pregnancy, thus making them vulnerable in early motherhood, although they acknowledge the possible contribution of older maternal age and associated perinatal complications. The only study to explicitly examine age effects in women conceiving with ART found older first-time mothers reported less identification with motherhood in pregnancy than younger ones, while prenatal attachment was comparable (McMahon, et al., 2007).

Higher education and potentially poorer health are additional contextual factors associated with older motherhood that may confound results. Many studies report higher rates of tertiary education in older mothers (Schmidt, et al., 2012), but few statistically control for its effects. There is also a view that older mothers may experience less optimal health (Berryman & Windridge, 1998) due to higher rates of pregnancy and birth complications and medical intervention at birth (Carolan & Frankowska, 2011), while their infants have a greater likelihood of preterm birth or low birth weight (Dickinson, 2012), all of which may adversely impact maternal adjustment (Mercer, 1986). Finally, older parents with longer relationships may have a different relationship context to earlier-conceiving couples, for example, less expressed warmth (Boivin, et al., 2009), or conversely more adaptive coping strategies (Bowman, 1990), which might also impact maternal adjustment.

Age and Psychological Maturity

Older age is often conceptualised as a proxy for maturity (Bornstein, et al., 2006), and personal maturity is proposed to predict maternal adaptation (Garrison, Blalock, Zarski, & Merritt, 1997; Gottesman, 1992). In their multi-dimensional models of the determinants of parenting, both Belsky (1984) and Heinicke (1984) identify parental psychological resources as particularly important. Similarly, maternal pre-birth psychological characteristics (e.g., ego strength, life adaptation), often referred to as indicators of maturity, have been found to predict better adjustment to parenthood (Grossman, et al., 1980; Shereshefsky & Yarrow, 1973). Research supporting the contention that older mothers possess psychological attributes as a result of their age that may enhance parenting abilities is limited (Belsky & Barends, 2002; Harker & Thorpe, 1992). Qualitative and quantitative studies have described the perceived benefits of older maternal age, including personal growth, maturity, preparedness for motherhood (Carolan, 2005; Frankel & Wise, 1982), greater psychological flexibility and integration (Mercer, 1986) and hardiness (McMahon, et al., 2007). These characteristics may contribute to better adjustment, but this has not been empirically confirmed. The aim of the current study is to systematically examine the relationships among age, psychological maturity, and adaptation during the transition to motherhood while also accounting for the effects of contextual variables.

Indices of Psychological Maturity

There is little consensus regarding empirical measures of psychological maturity in the parenting literature. Previous approaches have included clinical interviews tapping facets of psychological makeup such as life adaptation (Grossman, et al., 1980), ego strength (Heinicke, Diskin, Ramsey-Klee, & Given, 1983; Shereshefsky & Yarrow, 1973), psychological integration and flexibility (Mercer, 1986), and measures of ego development and ego resiliency (Belsky & Barends, 2002). Three measures were used in the current study

to tap those characteristics proposed to contribute to optimal adaptation during the transition to motherhood, namely the ability to tolerate ambivalence and negative affect, control impulses, demonstrate adaptation competence, and take another's perspective (Belsky & Barends, 2002; Cohen & Slade, 2000; Heinicke, et al., 1983).

From a self-regulatory perspective, the constructs of ego resiliency (Block & Block, 1980), and hardiness (Kobasa, Maddi, & Kahn, 1982) involve flexibility, resourceful adaptation, and internal control in the face of changing environments and stress. Both are thought to be relatively stable personality characteristics resulting from genetic factors and early familial experience, with further development in the context of life experience possible (Block & Block, 1980; Maddi, 2002). Ego resiliency has been found to increase and decrease in response to positive and negative life outcomes (Paris & Helson, 2002). Similarly, hardiness is believed to develop from repeated experiences of turning adversity into opportunity (Maddi, Khoshaba, Harvey, Fazel, & Resurreccion, 2011).

A social-cognitive conceptualization of psychological maturity examines the complexity individuals demonstrate in thinking about the self and others (Manners Gilmore & Durkin, 2001). This capacity is typically assessed using Loevinger's (1976) construct of ego development that proposes successively more mature levels of impulse control, cognitive complexity and interpersonal concerns. Ego development has been found to increase over the early years and stabilize in early adulthood, but further development is believed to be possible in light of challenging life experiences requiring new ways of thinking and adapting (Manners & Durkin, 2000).

Although some of these constructs have previously been considered as indices of psychological maturity in studies of parenting behavior (Belsky & Barends, 2002; Johnson & McMahon, 2008; van Bakel & Riksen-Walraven, 2002), it has not been established whether they are also involved in maternal adaptation in pregnancy and the early post-natal months.

The Present Study

The present study sought to explore the proposition that psychological maturity could be an advantage of older motherhood across the transition to parenthood using data from a prospective study examining parental age and the transition to parenthood in Australia (PATPA). Results from this study have previously shown associations among age, hardiness and adjustment during pregnancy (McMahon et al., 2011). To test our proposal we used a two-step modelling approach and included multiple measures of psychological maturity and adaptation to parenthood. The measurement model investigated the underlying latent constructs of psychological maturity (ego resiliency, hardiness, ego development), pregnancy adaptation (maternal fetal attachment, identification with motherhood, maternal self-confidence), as well as postnatal adjustment (adaptation to life change as a result of motherhood) at 4-6 months postpartum. The structural model examined relations among the latent dimensions together with maternal age, while controlling for education and maternal and infant health.

We predicted that older mothers would be more psychologically mature, that maturity would be related to more optimal adaptation in pregnancy and early motherhood, and that greater adaptation in pregnancy would predict more optimal postnatal adjustment. The direct and indirect effects of age (via maturity) on maternal adjustment were tested and we predicted only significant indirect associations. Given the increased likelihood that older women may require medical assistance to conceive, we also investigated whether the structural model was invariant across mode of conception. Finally, model testing took into account the effects of tertiary education and maternal and infant health.

Method

Participants

For the PATPA study, English speaking, nulliparous pregnant women, aged 20 years or older were recruited from ART clinics and antenatal classes in public and private hospitals in the vicinity of the clinics in two large Australian cities (Sydney and Melbourne). An explicit focus on maternal age and mode of conception informed recruitment of approximately equal numbers of pregnant women, both spontaneous and assisted conception, stratified across three age groups: ‘younger’, 20–30 years; ‘middle’, 31–36 years; and ‘older’, ≥ 37 years. ‘Older’ was defined as 37 years or older, the age at which fertility decline accelerates (Gleicher, Weghofer, & Barad, 2007). ‘Younger’ was defined as below the median age of birth (31 years) in Australia at the time (ABS, 2008). This paper reports only on those women recruited in Sydney who completed additional measures for this study.

Five hundred and nineteen eligible women were provided with information about the study, 317 (61%) consented to participate, 266 (84% of consenting women) completed all baseline measures in the larger study, and 240 (90% of these) also completed the additional measures relevant to the current study. Subsequent information concerns these 240 women. Of the sample, 59% ($n = 141$) conceived spontaneously, 35% ($n = 83$) following ART, and 7% ($n = 16$) had other fertility treatment (fertility drugs, ovulation induction, or intrauterine insemination) but not ART. The latter two groups were combined to form the ‘fertility treatment’ group. As shown in Table 1, most pregnancies were planned, and the majority of participants had a partner, were university educated, in professional occupations, and came from an English-speaking background. In keeping with older maternal age, cesarean section rates were high (45%). Most babies (94%) were born at or close to term. Nine women (approximately 4%) gave birth to twins. The infants were 125 boys and 124 girls.

Procedure

After gaining approval from relevant institutional ethics committees, consenting women participated in a structured telephone interview and completed a battery of

questionnaires in the third trimester of pregnancy ($M_{\text{gestation}} = 31$ weeks, $SD = 2$ weeks) and again between 4 – 6 months post-partum ($M_{\text{babyage}} = 19$ weeks, $SD = 3$ weeks).

Measures

Demographic and Reproductive History. In pregnancy, participants provided information regarding age, mode of conception, fertility treatment, whether the pregnancy was planned, education, partner and employment status, and language(s) spoken at home. Postnatal information included infant gestation, gender, and type of birth.

The measures completed in the third trimester of pregnancy were:

Psychological Maturity.

Hardiness. The Personal Views Survey 3rd Edition, Revised (PVS-III-R; Maddi & Khoshaba, 2001) is an 18-item questionnaire designed to assess psychological hardiness, a personality trait involving the ability to transform stressful experiences into opportunities for learning and personal development. Items are responded to on a 4-point scale from 0 (*not true at all*) to 3 (*very true*). Items form three subscales; commitment (being involved; e.g., “Trying your best at what you do usually pays off in the end”), control (being an initiator; e.g., “Most of the time, people listen carefully to what I have to say”), and challenge (continual learning; e.g., “Changes in routine provoke me to learn”). A higher total summed score for all the combined scale items (range 0 - 54) indicates greater hardiness. Reliability for the total scale was satisfactory (Cronbach’s $\alpha = .79$).

Ego resiliency. The 14-item Ego Resiliency Scale (ER89; Block & Kremen, 1996) assesses the capacity for flexible and resourceful adaptation to changing circumstances (e.g., “I like to take different paths to familiar places”). Items are rated on a 4-point scale from 1 (*does not apply at all*) to 4 (*applies very strongly*). A higher score (range 14 - 56) indicates higher resiliency. Cronbach’s alpha reliability for the current sample was .83.

Ego development. Ego development was assessed using the Washington University Sentence Completion Test Short Form 81 (SCT; Hy & Loevinger, 1996), a projective test requiring participants to complete 18 sentence stems (the first 18 of the full 36-items were used). The short form has comparable validity and reliability to the full form (Novy & Francis, 1992). A trained coder analyzed responses to the sentence stems with reference to the coding manual (Hy & Loevinger, 1996) and assigned an ego level rating based on Loevinger's (1976) nine stages of ego development (from the lowest level, E2 Impulsive, to the highest and rarely attained level, E9 Integrated). An independent coder scored 25% ($n=60$) of protocols, with high agreement between the two ($\kappa = .98$). The sum of all 18 items is recommended as the most reliable scoring method (Hy, Bobbitt, & Loevinger, 1998), with a higher score (range 36 -162) indicating higher ego development. Cronbach's alpha was .77.

Pregnancy Adaptation.

Maternal fetal attachment. The 24-item Maternal Fetal Attachment Scale (MFAS, Cranley, 1981) assesses the extent of affiliation with the unborn child (e.g., "I can almost guess what my baby's personality will be from the way s/he moves around"). Items are responded to on a 5-point scale from 0 (*definitely no*) to 4 (*definitely yes*), with a higher score (range 0 - 92) indicating more intense attachment. The item "I keep wondering what sex the baby is" was removed as many mothers now know the sex of their baby. Reliability was .81.

Maternal identity formation. The Childbearing Attitudes Questionnaire (CAQ, Ruble et al., 1990) is a 60-item scale that measures attitudes and characteristics relevant to adjustment during the transition to parenthood. The CAQ consists of 16 subscales in four domains: Self-confidence, Negative Aspects of Giving Birth, Social Orientation, and Identification with Motherhood. Only items from the scales 'Identification with Motherhood' (17 items, e.g. "Being pregnant makes me feel fulfilled as a woman") and 'Maternal Self-Confidence' (four items, e.g., "I am certain I will be a good mother") were administered.

Items are scored from 1 (*disagree strongly*) to 7 (*agree strongly*), with a higher summed score representing greater maternal self-definition (Identification with Motherhood range 17 - 119, reliability .77; Maternal Self-confidence range 4 - 28, reliability .85).

Pregnancy Health. A single question from the SF-36 (Ware & Sherbourne, 1992) 'In general, would you say your health was: poor, fair, good, very good or excellent' (rated 1 to 5) was used. This question has been validated in epidemiological research, with objective measures of health (Stewart, Hays, & Ware, 1988) and is sensitive to ongoing health-related problems including symptoms of physical functioning and well-being (Schytt & Waldenström, 2007).

Measures completed 4-6 months postpartum were:

Postnatal Adjustment. The 20-item Experience of Motherhood Questionnaire (EMQ, Astbury, 1994) assesses the impact of motherhood in terms of maternal anxiety/concern (e.g., "I get so much different advice it is hard to know what is best for the baby"), coping (e.g., "I am coping with the stresses of parenthood"), personal autonomy (e.g., "I have time to pursue my own interests"), satisfaction (e.g., "I feel great fulfilment in looking after the baby"), maternal overload (e.g., "I need a break from the demands of the child"), and relationship change (e.g., "I feel cut off from my friends"). The 4-point response scale was from 1 (*not at all*) to 4 (*very much*). Scores were reversed and summed so that higher scores (range 20 - 80) reflected positive emotional wellbeing, high levels of coping, and satisfaction. Reliability was .81.

Maternal Postnatal Health and Infant Health. The single question from the SF-36 (Ware & Sherbourne, 1992) 'In general, would you say your health was: poor, fair, good, very good or excellent' (rated 1 to 5), also administered in pregnancy, was used to assess postnatal health. Mothers were similarly asked to rate their infant's health 'Overall, is your baby's health: poor, fair, good, very good or excellent' (rated 1 to 5).

Data Analyses

Preliminary analyses were undertaken to identify missing data and test for normality of continuous variables and assess bivariate relationships among all study variables. Structural equation modelling using AMOS (Version 19; Arbuckle, 2010) with full information maximum likelihood estimation (Arbuckle, 1996) was used to evaluate the model. To overcome the sensitivity to sample size problem inherent in the chi-square goodness of fit index, the following fit indices and criteria of a good fit were also used: χ^2/df with a value less than 2 (Wheaton, Muthén, Alwin, & Summers, 1977), Tucker-Lewis index (TLI; Tucker & Lewis, 1973) and comparative fit index (CFI; Bentler, 1990) with cut-off values close to .95 (Hu & Bentler, 1999), and root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) with a value close to .06 (Hu & Bentler, 1999).

Initially, a measurement model was specified to investigate whether observed variables could be considered indicators of underlying latent factors representing dimensions of psychological maturity (ego resiliency, hardiness, ego development), pregnancy adaptation (maternal fetal attachment, identification with motherhood, maternal self-confidence) and postnatal adjustment (EMQ). Exploratory factor analysis suggested that the factor structure of the EMQ in this sample was different to that reported by Astbury (1994), potentially because the original sample comprised mothers of two-year old children and/or because those validation data were collected in 1989. The EMQ structure obtained comprised a relatively large number of factors (six) with a variable number of items per factors (some only one) arguing against these subscales being used as indicators for the measurement model. Given high overall scale reliability, we instead created four item parcels with EMQ items randomly allocated to each (Marsh, Hau, Balla, & Grayson, 1998). The creation of indicators using this approach is recommended to improve psychometric properties (Nasser & Takahashi, 2003).

After assessing the adequacy of the measurement model, a structural model examined relations among the latent dimensions, together with maternal age while controlling for education and maternal and infant health. Lastly, a model invariance test was conducted using multi-group analysis to establish the equivalence of the relationships in the model across mode of conception groups ('fertility treatment' and 'spontaneous').

Results

Preliminary Analyses

Less than 5% of all questionnaire items were missing. Mean substitution was used on scales where fewer than 10% of items were missing (hardiness and ego resiliency). On the SCT, missing sentence completions were assigned an E4 rating (the modal rating) (Hy & Loevinger, 1996). The protocol was not rated if more than three sentence completions were missing ($n = 6$). Variability in participant n is due to missing data on some measures. Assumptions of normality were satisfied. Two outliers (extreme low scores) were detected on maternal fetal attachment and these were changed to scores within three standard deviations of the mean (winsorized).

Bivariate Correlations

Correlations and means and standard deviations of study variables are shown in Table 2. Pearson correlations show that all three maturity variables (ego development, hardiness, ego resiliency) were significantly inter-correlated, as were the three pregnancy adaptation variables (maternal fetal attachment, identification with motherhood, maternal self-confidence). Age was significantly positively associated with all maturity variables and only significantly related (negatively) with identification with motherhood. Pregnancy health and maternal and infant health ratings were positively associated with hardiness, ego resiliency, and postnatal adjustment. Maternal postnatal health was also positively related to age.

Point-biserial correlations show that women who conceived after fertility treatment were significantly older, had higher fetal attachment and maternal self-confidence in pregnancy, and a higher rate of cesarean birth than women who conceived spontaneously. Older mothers also had a higher rate of cesarean birth as did women reporting poorer pregnancy health. Women with tertiary education had lower maternal self-confidence in pregnancy, higher pregnancy health ratings, and less optimal postnatal adjustment than women without a university degree. Postnatal adjustment and maternal and infant health were unrelated to relationship duration, gestation at birth, and infant age and gender and these variables were therefore not considered further (data not in table).

Model Testing

The initial measurement model yielded a significant chi-square goodness of fit, $\chi^2 = 66.19$, $df = 32$, $p < .001$, and marginally adequate alternate fit statistics, $\chi^2/df = 2.1$, TLI = .91, CFI = .95, and RMSEA = .07 (90% CI [.04, .09]). Modification indices suggested a covariance between the residuals of the observed variables of maternal fetal attachment and identification with motherhood would achieve a better model fit. Inter-item correlations showed highest shared variance not accounted for by the latent construct 'pregnancy adaptation' between caretaking items (feeding and holding the baby), separate to other aspects of affiliation with the unborn child and formation of a maternal identity in pregnancy. The residuals of these two variables were therefore correlated and the model tested again. Figure 1 shows the final measurement model with standardized factor loadings. This change resulted in a significantly different model fit ($\chi^2 = 12.519$, $df = 1$, $p < .001$) and improved fit indices: $\chi^2 = 53.68$, $df = 31$, $p < .01$; $\chi^2/df = 1.73$, TLI = .94, CFI = .97, and RMSEA = .06 (90% CI [.03, .08]). All indicators were significantly related to their proposed latent construct ($ps < .001$).

To further investigate the differential strength of the three indicators of psychological maturity in tapping the latent construct, tests of equality of factor loadings and of error variances among the three indicators, ego development, ego resiliency, and hardiness were undertaken. In initial tests, factor loadings, and then unique errors, were constrained to be equal for all three indicators. The loadings or variances of pairs of indicators (ego resiliency and hardiness; hardiness and ego development; ego development and ego resiliency) were then constrained to be equal with the remaining indicator left unconstrained, and model fit reassessed. The chi-square difference test was significant for all overall and pairwise tests of factor loadings and error variances (all $ps < .05$) indicating that each scale/indicator (ego resiliency, hardiness, and ego development) tapped a significantly different aspect of psychological maturity, and that the unexplained variance was different for each indicator.

A full-measurement structural equation model was then tested to examine associations among all latent constructs (psychological maturity, pregnancy adaptation, and postnatal adjustment) together with age while controlling for education and maternal and infant health. Pregnancy health was not related to age, pregnancy adaptation, infant health, or postnatal adjustment and was removed from the model as the number of parameters estimated in the model when pregnancy health was included exceeded that recommended for a structural equation analysis for this sample size. Figure 2 shows results for the final structural model with standardized coefficients for significant paths. Although the chi-square goodness of fit index was significant ($\chi^2 = 85.33$, $df = 60$, $p < .05$) other fit indices indicated the model was a good fit to the data: $\chi^2/df = 1.42$, TLI = .94, CFI = .97, and RMSEA = .04 (90% CI [.02, .06]). Age was significantly directly associated only with psychological maturity. Psychological maturity was significantly associated with more optimal pregnancy adaptation, and predicted more optimal postnatal adjustment, as did pregnancy adaptation. Psychological maturity was associated with better postpartum maternal health and infant health. Tertiary education was

associated with lower pregnancy adaptation and predicted less optimal postnatal adjustment. Maternal health and infant health were associated with better postnatal adjustment.

Bootstrapping in AMOS was used to test the indirect effect of age on pregnancy adaptation, postnatal adjustment and postnatal health. Missing data ($n = 16$) were imputed using model-based Bayesian multiple imputation in order to conduct the bootstrapping analysis. Age was significantly indirectly related to both pregnancy adaptation ($\beta = .10, p = .001$) and postnatal adjustment ($\beta = .13, p < .01$), and to maternal health ($\beta = .10, p = .001$) and infant health ($\beta = .10, p < .01$), through psychological maturity. Psychological maturity was also indirectly related to postnatal adjustment through pregnancy adaptation ($\beta = .18, p < .01$). To ensure data imputation did not significantly alter results, bootstrapping was also undertaken with missing data cases omitted; results were unchanged.

To further examine whether age adds any substantive variance once maturity is included in the model, we constrained the direct effects of age on pregnancy adaptation, postnatal adjustment, and health variables to zero which did not result in significant worsening of model fit, $\chi^2 = 2.70, df = 4, p = .61$. Given the potential confounding effect of maternal education via maturity on adjustment, we also constrained the direct effects of education (to zero) on pregnancy adaptation, postnatal adjustment, and health variables, which resulted in significant worsening of model fit, $\chi^2 = 26.19, df = 4, p < .0001$, suggesting education has an impact independent of maturity.

Finally, we examined whether the model applied equivalently for mode of conception groups ('fertility treatment' and 'spontaneous'). Invariance testing was undertaken in AMOS with latent factor loadings and structural paths constrained to be the same for both groups. This resulted in no significant worsening of model fit when comparing the constrained and unconstrained models, $\chi^2 = 22.68, df = 26, p = .65$, indicating similar patterns of associations

across groups. The fit indices for the constrained model were: $\chi^2 = 187.94$, $df = 146$, $p < .05$; $\chi^2/df = 1.29$; TLI = .92; CFI = .94; and RMSEA = .04 (90% CI [.02, .05]).

Discussion

The results of the current study suggest that psychological maturity associated with increasing age, rather than age per se, plays an important role in adaptation during the transition to motherhood. Results provide empirical support for the notion that older mothers are more psychologically mature, while also showing that more mature mothers adapt more favourably to pregnancy and experience better postnatal adjustment. Age contributes to adaptation in pregnancy and early motherhood but only indirectly through its link to maturity. Additionally, women who are more engaged with the developmental tasks of pregnancy experience more optimal adjustment to early motherhood. These associations apply for women who conceived using fertility treatment and those who conceived spontaneously. Findings confirm assumptions regarding the psychological benefits that may underlie chronological age effects in parenting studies (Bornstein, et al., 2006; Ragozin, et al., 1982), and extend research by focusing on adaptation in pregnancy and the early postnatal months.

Psychological Maturity

While all three indices of psychological maturity (ego development, ego resiliency, hardiness) were significant indicators of the underlying latent construct, the significant differences between factor loadings and error variances suggests that each measure involves a distinct aspect. Ego development represents a conceptually broad notion of maturity within a social-cognitive framework, compared with the more self-regulatory focus of hardiness and ego resiliency. Ego development involves an integrative cognitive process for dealing with experiences, providing a frame of reference from which each person makes sense of themselves and the world (Manners Gilmore & Durkin, 2001). This notion of maturity involves a more complex way of thinking, perceiving, and organising experience. Hardiness

and ego resiliency, on the other hand, belong to a class of constructs believed to tap the dynamic properties of the self-system, specifically the ability of the self to execute and integrate psychological functions to adaptively respond to potentially stressful experiences (Gramzow, Sedikides, Panter, & Insko, 2000). The ego resilient person does this by flexibly altering the degree of ego (impulse) control to enhance coping abilities, while hardiness involves cognitive appraisals that support a tolerable interpretation of potential stressors (Gramzow, et al., 2000). These differences highlight the continuing challenge of empirically conceptualizing the construct of psychological maturity and the need for further research on its differing theoretical perspectives and distinct but interrelated facets, namely the capacity for self-world complexity and for adaptive self-regulation.

Age was significantly related to the latent psychological maturity construct and its individual indicators. However, the small proportion of the variance in maturity explained by age suggests that while women may become more mature as they age, other factors are clearly more important. Loevinger (1976) proposed that age is a necessary but not sufficient condition for reaching higher stages of ego development and that movement through the stages is influenced by certain kinds of environmental stimulation (Manners & Durkin, 2000). Similarly, Paris and Helson (2002) suggest that ego resiliency increases and decreases with life task successes or setbacks, while Maddi et al. (2011) view hardiness as evolving from new, often stressful or unexpected experiences which are part of the ongoing developmental process. Interestingly, there was no association between tertiary education and psychological maturity. Although higher education might be expected to facilitate cognitive development, it is probably the experience of and response to positive and negative life events that contributes to significant shifts in maturity (Manners & Durkin, 2000).

Adaptation during the Transition to Motherhood

Given equivocal results from previous studies, we sought to further investigate the effect of age in relation to maternal adaptation while accounting for the influence of psychological maturity and potential age-related confounds. Age did not have direct effects on adaptation in pregnancy or postnatally, whereas psychological maturity did. Psychological maturity was also associated with better self-reported infant and maternal postpartum health. Pregnancy adaptation predicted more optimal postnatal adjustment, consistent with previous findings (Kiehl & White, 2003; Mothander, 1992). These results support Leifer's (1980) assertion that women with higher levels of personal integration are likely to make better psychological use of pregnancy, and are consistent with findings that maternal psychological adaptation to life was related to successful coping with the demands of pregnancy and motherhood (Grossman, et al., 1980; Heinicke, et al., 1983).

Age was correlated (negatively) only with identification with motherhood in pregnancy. Given the increased risk of adverse perinatal outcome, older women may be reluctant to assume a maternal identity until after the birth of their baby, a strategy reported in a qualitative study of older mothers (Carolan, 2005). Alternatively, older women have more established lifestyles and greater investment in their occupational role (Cohen & Slade, 2000), which might also contribute to a lower identification with motherhood in pregnancy. This interpretation is suggested by 'Identification with Motherhood' scale items, for example "Being pregnant increases my sense of independence" and "Whenever I see a baby I feel like picking it up", an arguably idealized view of motherhood that may not be endorsed by women who have had a longer period to invest in life without children. The theoretical importance of identification with motherhood in pregnancy is underscored by the significant correlation between this variable and more optimal postnatal adjustment. When the developmental tasks of pregnancy were considered as the latent factor 'pregnancy adaptation', however, there was no association with age, suggesting overall comparable

psychological preparation for motherhood regardless of age. However, the participant age range was 24 to 43 years and wider sampling may have yielded different results.

The conceptual differences between the three indices of maturity are again illustrated in the associations with measures of maternal adaptation. Ego development was the only index of maturity unrelated to measures of pregnancy adaptation and postnatal adjustment. Loevinger (1976) acknowledged that higher ego development is not necessarily related to adjustment or well-being, a finding confirmed in a number of empirical studies (Helson & Roberts, 1994; Helson & Wink, 1987). In contrast, hardiness was significantly related to all adaptation variables in pregnancy and postnatally, and ego resiliency was related to all but identification with motherhood in pregnancy. These findings are novel in suggesting that the hardiness construct, which manifests as the tendency to involve oneself, to identify and find meaning, and to feel as if one is influential in the experience at hand (Kobasa, et al., 1982) may be useful in understanding adaptation to early motherhood.

In a further unique contribution we considered whether associations between age, maturity, and maternal adaptation would be equivalent for women conceiving spontaneously and those requiring fertility treatment. On individual measures, women conceiving after fertility treatment reported higher fetal attachment and maternal-self-confidence than women conceiving spontaneously, replicating previous fetal attachment findings (Fisher, et al., 2008; McMahon, et al., 2011). Researchers have cautioned that intense preoccupation with the fetus and idealised expectations of motherhood may leave women vulnerable when they experience the inevitable challenges of parenthood (Fisher, et al., 2008). However, the associations in the overall model of maternal adaptation applied irrespective of mode of conception. Given that women who require fertility treatment are generally older, the relationships in the model suggest that the adaptive advantages of greater psychological maturity may counter any perceived 'vulnerability' in adjusting to early motherhood.

No association between maternal age and education was evident in this sample, probably due to participants (even younger ones) being predominantly tertiary educated. Results showing lower levels of pregnancy adaptation and less optimal postnatal adjustment among tertiary educated women suggest more educated women may experience greater difficulty altering established roles to become maternally oriented in pregnancy and adjusting to the realities of early motherhood, perhaps due to a greater focus on professional identity (Harker & Thorpe, 1992). Mercer (1986) found a consistent association between higher education and less gratification in the mothering role. Despite this, it appears that psychological maturity has a greater impact in terms of maternal adaptation than the contrary effect of tertiary education when both are considered together.

The study took into account evidence that older women may experience pregnancy and birth complications (Carolan & Frankowska, 2011), with maternal and infant health potentially impacting maternal adjustment (Mercer, 1986). Although older women in this sample were more likely to have had a cesarean birth, there was no association between age and self-reported maternal health in pregnancy or postnatally, nor between maternal age and less optimal infant health. Indeed, maternal age was indirectly related to better maternal postnatal health and infant health through psychological maturity, which predicted better health in early parenthood. More mature mothers may have mental models in pregnancy that facilitate healthy behaviors towards the fetus (Fulford, Macklon, & Boivin, 2014) and/or engage in fewer health-compromising behaviors. There is evidence that greater self-regulatory capacities may be protective (Berryman & Windridge, 1998; Dillon & Totten, 1989), which is consistent with the associations between health variables and both hardiness and ego resiliency in the current study. The health measures used were limited to maternal self-report, however, possibly capturing a perception of better health among more mature mothers. While pregnancy health was associated at a univariate level with postnatal

adjustment, its contribution was not significant when other relevant variables were also included in the model. However, the significant relationship between postnatal adjustment and both postnatal maternal health and infant health (although causal direction is speculative due to concurrent assessment of these variables) underscores the importance of considering health in future studies.

Strengths and limitations

This study sought to examine the impact of older maternal age on adaptation to parenthood by specifically considering the role of psychological maturity, together with contextual and demographic factors not considered in other studies. Although the homogeneity of participants can be viewed as a limitation, the fact that participants were predominantly socio-economically advantaged, in established relationships, English speaking, and tertiary educated suggests the current findings are robust and unlikely to result from confounding demographic factors. Further, these characteristics are typical of older first-time mothers and those using assisted conception (Carolan & Frankowska, 2011; Hammarberg, et al., 2008; Schmidt, et al., 2012). Nevertheless, the generalizability of results is limited, especially in relation to younger participants, who are unlikely to be socio-demographically representative of younger mothers in the population, and mothers in non-urban areas.

Although the prospective longitudinal design allows for causal inferences in terms of the effect of psychological maturity and pregnancy adaptation on early postnatal adjustment, causal interpretations are merely speculative. Future research could investigate alternative models together with different conceptualizations of psychological maturity and less reliance on self-report measures, which may not adequately reflect the lived experience of the transition to parenthood for first-time mothers. Future longitudinal research incorporating different measures of postnatal adjustment (e.g., parenting stress), observational measures of

maternal caregiving and mother-infant interaction, more objective measures of health, and qualitative perceptions, might enable a more detailed understanding. Further research is also needed to better understand the functions and impacts of the different components of psychological maturity (in this study, self-world complexity and adaptive self-regulation) which may have differential importance according to outcome.

Conclusions

The current study provides empirical support for the notion that increasing age is associated with higher levels of psychological maturity, and demonstrates that psychological maturity rather than age per se plays an important role in adaptation during the transition to motherhood. Psychological maturity is related to positive engagement with the developmental tasks of pregnancy, and both psychological maturity and pregnancy adaptation predict more optimal adjustment to early motherhood, regardless of mode of conception. Adaptation to parenthood in the early months is important for maternal emotional wellbeing and has longer-term implications for child development outcomes (Anhalt, et al., 2007). While there are valid medical concerns about delayed childbearing (Schmidt, et al., 2012), the timing of parenthood is often the result of factors outside a woman's control. Findings from the current study might reassure women that, from a psycho-social perspective, greater psychological maturity and the associated adaptive benefits it provides may be advantageous for older first-time mothers.

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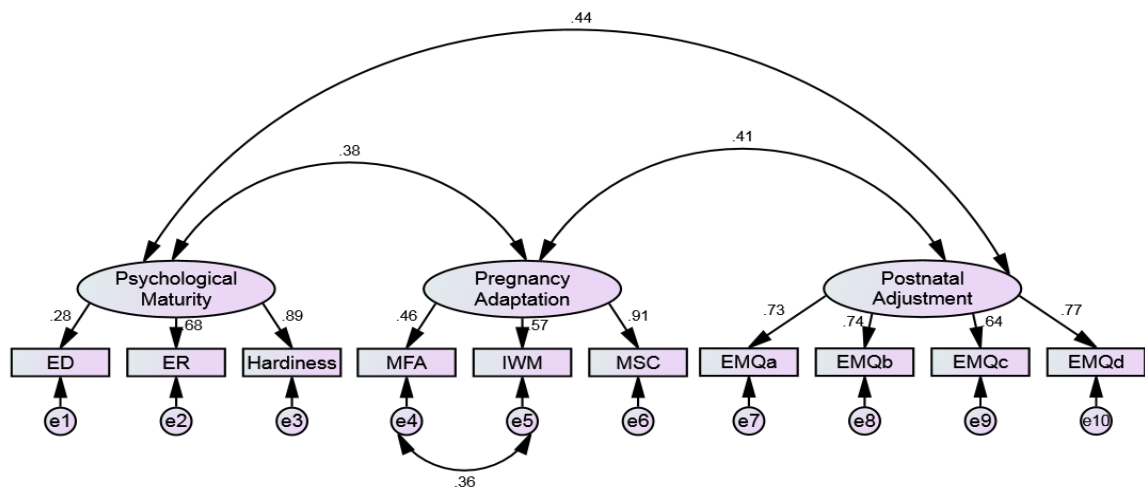


Figure 1. Measurement model showing latent constructs of psychological maturity, pregnancy adaptation and postnatal adjustment with standardized factor loadings. All indicators of latent constructs $p < .001$. Fit indices: $\chi^2 = 53.68$, $df = 31$, $p < .01$; $\chi^2/df = 1.73$, TLI = .94, CFI = .97, and RMSEA = .06 (90% CI [.03, .08]).

Note. ED = Ego Development, ER = Ego Resiliency, MFA= Maternal Fetal Attachment, IWM = Identification with Motherhood, MSC = Maternal Self-Confidence, EMQa-d = Experience of Motherhood Questionnaire item parcels

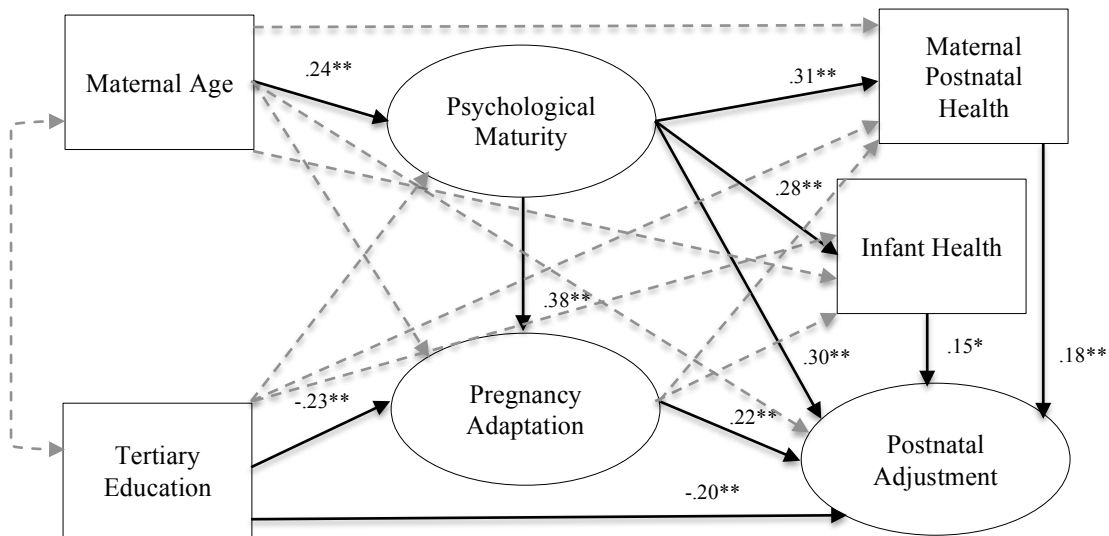


Figure 2. Structural Equation Model showing standardized estimates of significant paths among age, psychological maturity, pregnancy adaptation, postnatal adjustment, tertiary education, and maternal and infant health. Non-significant paths shown with dashed lines in grey. Fit indices: $\chi^2 = 85.33$, $df = 60$, $p < .05$; $\chi^2/df = 1.42$, $TLI = .94$, $CFI = .97$, and $RMSEA = .04$ (90% CI [.02, .06]).

* $p < .05$. ** $p < .01$.

Table 1

Participant Demographic and Contextual Characteristics by Age Group and Mode of Conception Group

		Age Group ≤ 30 <i>n</i> = 95	Age Group 31-36 <i>n</i> = 80	Age Group ≥ 37 <i>n</i> = 65	Total Sample <i>N</i> = 240	Spontaneous Conception <i>n</i> = 141	Fertility Treatment <i>n</i> = 99
Age (years) ^{1,2 a}	M (SD)	28.22 (1.51)	33.31 (1.70)	38.89 (1.74)	32.81 (4.60)	31.72 (4.34)	34.36 (4.54)
Tertiary education	<i>n</i> (%)	58 (61%)	57 (71%)	46 (71%)	161 (67%)	100 (71%)	61 (62%)
English-only at home	<i>n</i> (%)	70 (73%)	63 (79%)	51 (79%)	184 (77%)	105 (75%)	77 (77%)
Professional Occupation	<i>n</i> (%)	66 (68%)	63 (79%)	54 (84%)	182 (76%)	109 (77%)	78 (80%)
Partnered	<i>n</i> (%)	95 (100%)	78 (97%)	63 (97%)	236 (98%)	138 (98%)	98 (99%)
Relationship duration (years) ^{1,2}	M (SD)	5.56 (3.02)	6.24 (3.44)	7.99 (4.95)	6.43 (3.87)	5.90 (4.03)	7.18 (3.50)
Fertility treatment ^{1 b}	<i>n</i> (%)	28 (30%)	31 (39%)	40 (40%)	99 (41%)	—	—
Unplanned pregnancy	<i>n</i> (%)	12 (13%)	10 (12%)	5 (8%)	27 (11%)	27 (11%)	0
Cesarean birth ^{1,2}	<i>n</i> (%)	38 (40%)	28 (35%)	41 (64%)	107 (45%)	55 (39%)	52 (53%)
Gestation at birth (weeks) ²	M (SD)	39.34 (1.65)	39.49 (2.01)	39.22 (1.76)	39.36 (1.80)	39.65 (1.72)	38.94 (1.83)

Note. ¹Age-groups differ at $p < .05$. ²Mode of conception groups differ at $p < .05$.

^aAge range of participants 24 – 43 years. ^bDue to sampling strategy proportion not representative of general population.

Table 2
Correlation Matrix and Means (M) and Standard Deviations (SD) of Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	M (SD)
1. Age in years	—													32.81 (4.60)
2. Hardiness	.21**	—												39.81 (5.47)
3. Ego resiliency	.19**	.60***	—											41.35 (6.15)
4. Ego development ($n=234$)	.18**	.25***	.20**	—										92.08 (7.62)
5. Maternal fetal attachment	-.07	.21**	.17*	.06	—									68.87 (9.60)
6. Identification with motherhood ($n=232$)	-.14*	.21**	.09	.01	.52***	—								83.95 (10.44)
7. Maternal self-confidence ($n=239$)	.08	.31***	.26***	.05	.42***	.51***	—							21.07 (4.39)
8. Pregnancy health	.05	.34***	.26***	.11	.07	-.01	.09	—						3.99 (.82)
9. Experience of motherhood	.02	.34***	.26***	.10	.19**	.20**	.34***	.18**	—					63.37 (7.54)
10. Fertility treatment (0 = no, 1 = yes)	.28***	.11	-.01	.09	.15*	.07	.13*	.03	.06	—				—
11. Tertiary education (0 = no, 1 = yes)	.09	.12	.06	.12†	-.02	-.07	-.18**	.21**	-.19**	-.10	—			—
12. Type of birth ($n=239$) (0 = vaginal, 1 = cesarean)	.22**	.01	-.07	.12	.03	.02	-.00	-.14*	-.04	.13*	-.05	—		—
13. Maternal health	.16*	.32***	.16*	.11	.10	.04	.12†	.50***	.27***	.06	.08	-.06	—	3.56 (.89)
14. Infant health ($n=237$)	.06	.22**	.13*	.06	.02	.03	.05	.08	.24***	.06	-.08	.02	.12	4.69 (.67)

Note. $N=240$ unless otherwise indicated.

† $p \leq .06$. * $p < .05$. ** $p < .01$. *** $p < .001$.